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Date March 27, 2000

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PATENT CASE: OC01017Q

#### IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: MOHAMED H. RAGAB

Group Art Unit: (To Be Assigned)

For Patent: IMPROVED CANCER

TREATMENT WITH TEMOZOLOMIDE

Examiner: (To Be Assigned)

Serial No.: (To Be Assigned)

Filed: March 27, 2000

Date: March 27, 2000

Schering-Plough Corporation Kenilworth, New Jersey 07033

**Assistant Commissioner for Patents** Washington, D.C. 20231

#### PRELIMINARY AMENDMENT

Sir:

Please enter the following amendment prior to examining the above-identified application:

#### In the Specification

On page 1, before "BACKGROUND OF THE INVENTION," insert the following:

> -- This application claims the benefit of U.S. Provisional Application No. 60/126,808, filed March 30, 1999.--

#### Remarks

The amendment has been made to refer to Applicant's earlier provisional application.

Respectfully submitted,

Arthur Mann Reg. No. 35,598

Attorney for Applicant (908) 298-2903

#### PATENT APPLICATION

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#### IMPROVED CANCER TREATMENT WITH TEMOZOLOMIDE

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ASSIGNEE: Schering Corporation

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## IMPROVED CANCER TREATMENT WITH TEMOZOLOMIDE

This invention relates to the treatment of cancer and in particular to the treatment of cancers with Temozolomide.

#### **BACKGROUND OF THE INVENTION**

Temozolomide is known for its anti-tumor effects. For example, in one study clinical responses were achieved in 17% of patients having advanced melanoma (Newlands et al. Br. J. Cancer 65 (2) 287-291 (1992)). In another study, a clinical response was achieved in 21% of patients with advanced melanoma (Journal of Clinical Oncology, Vol 13, No. 4 (April), 1995, pp 910-913). Treatment of gliomas in adults with temozolomide is also known (Eur. J. Cancer 1993; 29A:940). Treatment of the following cancers in adults with temozolomide has also been disclosed: metastatic melanoma; high grade glioma, glioblastoma and other brain cancers; lung cancer; breast cancer; testIcular cancer; colon and rectal cancers; carcinomas; sarcomas; lymphomas; leukemias; and mycosis fungoides. Prior to the present invention, the generally accepted method for administering temozolomide was to administer it over a 28 day cycle, in which it is administered daily for the first 5 days of the cycle, followed by 23 days of rest, in which it is not administered. Newlands et al., Br. J. Cancer 65 (2) 287-291 (1992). A clinical trial has also been carried out wherein temozolomide was administered continuously as a daily dose for 6-7 weeks in conjunction with radiation treatment. See, e.g., Brock et al., Cancer Research 58, 4363-4367 (1998).

#### **SUMMARY OF THE INVENTION**

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The present invention provides a method for treating a patient afflicted with cancer, comprising administering temozolomide to said patient for at least two cycles of a cyclical dosing schedule, wherein each cycle comprises a dosing period of 5 to 25 days, in which temozolomide is administered daily, at a dose of 40 to 150 mg/m²/day, followed by a rest period of 5 to 14 days in which temozolomide is not administered.

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In a further aspect of the present invention, a medical kit for administering temozolomide is provided, comprising printed instructions for administering temozolomide according to the cyclical dosing schedule set forth above, and a supply of temozolomide in dosage units for at least one cycle, wherein each dosage unit comprises 5 to 250 mg of temozolomide and a pharmaceutically acceptable carrier.

#### **DETAILED DESCRIPTION**

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The term "temozolomide" is intended to mean a compound having the formula:

One chemical name for temozolomide is 3,4-dihydro-3-methyl-4-oxoimidazo-[5,1-d]1,2,3,4-tetrazin-8-carboximide. The synthesis of temozolomide is well known. See, for example, Stevens et al., J. Med. Chem, 1984, 27, 196-201 and Wang et al., J. Chem. Soc., Chem. Commun., 1994, pp 1687-1688.

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As used herein, the term "mg/m²/day" refers to a daily dose measured in milligrams per square meter of body surface area of the patient.

As used herein, the term "patient" refers to a mammal, preferably a human.

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Examples of cancers treatable by this invention include, but are not limited to melanoma; high grade glioma, glioblastoma and other brain cancers; lung cancer; breast cancer; testicular cancer; gastro intestinal cancers including colon, rectal, pancreatic, and gastric cancers, hepatocellular carcinoma; head and neck cancers; prostate cancer, renal cell carcinoma; adenocarcinoma; sarcomas; lymphomas; leukemias; and mycosis fungoides. This invention contemplates treating these cancers and other cancers at any stage from the discovery of the cancer to the advanced stage. The invention includes treatment of the primary cancer and metastases thereof.

A person afflicted with cancer may exhibit one or more of the following signs or symptoms:

- (a) presence of cancerous tumor,
- (b) fatigue,
- (c) pain,
- 10 (d) decreased performance status from tumor burden, and
  - (e) the well known symptoms associated with each specific cancer.

The rest period according to the present invention (the portion of the cycle in which temozolomide is not administered) is 5 to 14 days, more preferably, 5 to 10 days, most preferably, 1 week. The dosing period according to the present invention is 5 to 25 days, more preferably, 1, 2, or 3 weeks, most preferably 1 or 3 weeks. The treatment cycles may be continued for as long as needed to cause the cure, remission, or elimination of the cancer that is being treated.

The daily dose during the dosing period of the present invention is 40 to 150 mg/m²/day, more preferably 40 to 125 mg/m²/day, most preferably 75 to 125 mg/m²/day. The daily dose may be administered as a single dose, or as multiple doses adding up to the single dose. For example, a daily dose of 100 mg/m² may be administered as two doses of 50 mg/m², or four doses of 25 mg/m². The selected dosage may be decreased, if intolerable side effects or hematologic toxicity are encountered.

A common, but tolerable side effect of temozolomide is nausea and vomiting. This can be alleviated by administering an anti-emetic in conjunction with the temozolomide. It is preferred that the anti-emetic Ondansetron be given p.o. in a dose of about 8 mg about 30 minutes before temozolomide administration. Other anti-emetics such as Hasaldol, Benadryl, and Ativan may also be used as needed.

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Temozolomide is preferably administered orally in capsule form wherein it is admixed with conventional pharmaceutical carriers. Preferred temozolomide capsule formulations are:

<u>Ingredient</u>		mg/Ca	<u>ipsule</u>	
temozolomide	5	20	100	250
Anhydrous Lactose NF	132.8	182.2	175.7	154.3
Sodium Starch Glycolate NF	7.5	11.0	15.0	22.5
Colloidal Silicon Diozide NF	0.2	0.2	0.3	0.7
Tartaric Acid NF	1.5	2.2	3.0	9.0
Steric Acid NF	3.0	4.4	6.0	13.5
Capsule Size*	3	2	1	0

<sup>\*</sup> White opaque, preservative-free, two-piece hard gelatin capsules

Other forms of administration of temozolomide, as they become available, are contemplated, such as by IV injection or infusion, intrathecally, by sustained release dosage form, syrup, suppository, transdermal, nasal spray, etc.. Any form of administration will work so long as the proper dosage is delivered without destroying the temozolomide.

It may be preferable in some instances to administer an initial large oral bolus dose of about 100 to 500 mg/m<sup>2</sup> prior to beginning the cyclical dosing regimen of the present invention.

The medical kit in accordance with the present invention may be in any form suitable for providing a supply of temozolomide for at least one cycle, together with written instructions for administering it according to the cyclical dosing schedule. Examples include, but are not limited to, various containers (e.g., bottles, cartons, blister packs, and ampules) either accompanied by a package insert describing the cyclical dosing instructions, or wherein the cyclical dosing instructions are printed on, or affixed to the container.

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The following examples illustrate the foregoing invention, although such examples should not be construed as limiting the scope of the invention.

#### **EXAMPLE 1**

To a patient suffering from glioma, administer temozolomide for a period of twelve 14-day cycles, each cycle consisting of a one week period in which temozolomide is administered at the rate of 100 mg/m²/day, followed by a one week rest period in which temozolomide is not administered.

#### **EXAMPLE 2**

To a patient suffering from glioma, administer temozolomide for a period of six 28-day cycles, each cycle consisting of a three week period in which temozolomide is administered at the rate of 100 mg/m²/day, followed by a one week rest period in which temozolomide is not administered.

#### **EXAMPLE 3**

To a patient suffering from advanced melanoma, administer temozolomide for a period of twelve 14-day cycles, each cycle consisting of a one week period in which temozolomide is administered at the rate of 100 mg/m²/day, followed by a one week rest period in which temozolomide is not administered.

#### EXAMPLE 4

To a patient suffering from advanced melanoma, administer temozolomide for a period of six 28-day cycles, each cycle consisting of a three week period in which temozolomide is administered at the rate of 100 mg/m²/day, followed by a one week rest period in which temozolomide is not administered.

While the present invention has been described in conjunction with the specific embodiments set forth above, many alternatives, modifications and variations thereof will be apparent to those of ordinary skill in the art. All such alternatives, modifications and variations are intended to fall within the spirit and scope of the present invention.

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#### WE CLAIM:

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- 1. A method for treating a patient afflicted with cancer, comprising administering temozolomide to said patient for at least two cycles of a cyclical dosing schedule, wherein each cycle comprises a dosing period of 5 to 25 days, in which temozolomide is administered daily, at a dose of 40 to 150 mg/m²/day, followed by a rest period of 5 to 14 days in which temozolomide is not administered.
  - 2. The method of claim 1, wherein the rest period is 5 to 10 days.
  - 3. The method of claim 2, wherein the daily dose is 75 to 125 mg/m²/day.
  - 4. The method of claim 1, wherein the rest period is one week.
  - 5. The method of claim 4, wherein the daily dose is 75 to 125 mg/m²/day.
  - 6. The method of claim 1, wherein the dosing period is one, two, or three weeks.
  - 7. The method of claim 6, wherein the rest period is one week.
  - 8. The method of claim 7, wherein the dosing period is one week.
  - 9. The method of claim 8, wherein the daily dose is 75 to  $125 \text{ mg/m}^2/\text{day}$ .
  - 10. The method of claim 7, wherein the dosing period is three weeks.
  - 11. The method of claim 10, wherein the daily dose is 75 to 125 mg/m²/day.
  - 12. A medical kit for administering temozolomide, comprising:
- (a) printed instructions for administering temozolomide to a patient afflicted with cancer for at least two cycles of a cyclical dosing schedule, wherein each cycle comprises a dosing period of 5 to 25 days, in which temozolomide is administered daily, at a dose of 40 to 150 mg/m²/day, followed by a rest period of 5 to 14 days in which temozolomide is not administered; and
  - (b) a supply of temozolomide in dosage units for at least one cycle, wherein each dosage unit comprises 5 to 250 mg of temozolomide and a pharmaceutically acceptable carrier.

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- 13. The medical kit of claim 12, wherein the instructed rest period is 5 to 10 days.
- 14. The medical kit of claim 13, wherein the instructed daily dose is 75 to 125  $\text{mg/m}^2/\text{day}$ .
  - 15. The medical kit of claim 12, wherein the instructed rest period is one week.
- 16. The medical kit of claim 15, wherein the instructed daily dose is 75 to 125  $\text{mg/m}^2/\text{day}$ .
- 17. The medical kit of claim 15, wherein the instructed dosing period is one, two, or three weeks.
- 18. The medical kit of claim 15, wherein the instructed dosing period is one week, and the instructed daily dose is 75 to  $125 \text{ mg/m}^2/\text{day}$ .
- 19. The medical kit of claim 15, wherein the instructed dosing period is three weeks, and the instructed daily dose is 75 to  $125 \text{ mg/m}^2/\text{day}$ .

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#### **ABSTRACT**

A method for treating a patient afflicted with cancer is provided, in which temozolomide is administered to the patient for at least two cycles of a cyclical dosing schedule, wherein each cycle has a dosing period of 5 to 25 days, in which temozolomide is administered daily, at a dose of 40 to 150 mg/m²/day, followed by a rest period of 5 to 14 days in which temozolomide is not administered.

Also provided is a medical kit for administering temozolomide, having printed instructions for administering temozolomide according to the cyclical dosing schedule set forth above, and a supply of temozolomide in dosage units for at least one cycle, wherein each dosage unit contains 5 to 250 mg of temozolomide and a pharmaceutically acceptable carrier.

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## **DECLARATION** — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.													
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Country	USA			Te	elephon	ne (90	)8) <b>29</b> :	8-2903	,	Fax	(908	3) 298-5388	}
believed to be punishable by	true; and fine or in	I statements mad further that the opposite of	ese state both, ur	ements	were m	nade with	h the kno	owledge	that willful fa	lse state	ments	and the like so	made are
Name of So	ole or F	irst Invento	r:					A petitic	n has been	filed fo	r this u	ınsigned inve	ntor
Gi	ven Nar	ne (first and m	niddle [if	any])			$\Box$		Family	y Name	or Su	mame	
Mohamed	Н.						R	lagab					
Inventor's Signature		Holia	مميو	Jul	the-							Date	3/160
Residence: 0	City	Westfield			State	NJ	,	Country	U.S.A.			Citizenship	U.S.A.
Post Office A	ddress	1616 Boy	nton A	venu	.e								
Post Office A	ddress					-							
City		Westfield	State	NJ		z	JP 0	7090		Cou	ntry	U.S.A.	
□Additional	invento	rs are being n	amed o	n the	su	ppleme	ntal Ad	dîtional	inventor(s)	sheet(s	) PTO/	SB/02A attac	hed hereto

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### **DECLARATION**

#### REGISTERED PRACTITIONER INFORMATION (Supplemental Sheet)

Name	Registration Number	Name	Registration Number
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Edwin P. Ching	34090	Anita W. Magatti	29825
Eric S. Dicker	31669	Arthur Mann	35598
Cynthia L. Foulke	32364	Christine F. Martin	39762
Robert A. Franks	28605	Edward H. Mazer	27573
Kenneth M. Goldman	34174	Jaye P. McLaughlin	41211
James M. Gould	33702	Richard B. Murphy	35296
Richard J. Grochala	31518	James R. Nelson	27929
Henry S. Hadad	35888	David B. Schram	43096
Thomas D. Hoffman	28221	Immac J. Thampoe	36322
Henry C. Jeanette	30856	Paul A. Thompson	35385
Palaiyur S. Kalyanaraman	34634	Joanne P. Will	35737
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